

The same principle was soon applied to the open hearth furnace, simply by building in a basic or neutral lining, capable of resisting the action of a highly basic slag.

This lining is made of burnt dolomite or magnesite, mixed with tar and rammed into place. It must be understood that the lining is essentially neutral or passive, and takes no part in the removal of phosphorus. It is the function of the lining simply to provide a strong support for the charge, and to be indifferent to the chemical action being carried on on the hearth, thus being free from corrosion by the metal or slag. These desirable conditions are only partially fulfilled owing to necessary restrictions in choice and cost of material.

Bessemer deservedly receives great credit for the complete form in which he delivered his process to the world, very few changes, and those only in minor mechanical details, have been made over his original ideas. Sir Wm. Siemens, known by reputation in so many departments of science by his genius and inventions, has by indefatigable sound scientific work given the open hearth process complete to us to-day, and further improvements in America are thought by practical experts to be in the line of his later patents.

In considering the construction of the open hearth furnace we will start with its most essential feature, the regenerators. These consist of four chambers filled with checker work, placed below the level of the hearth, connecting the furnace with the chimney, two are for the use of the incoming gas and air, and the others for the exit of the products of combustion to the chimney. In passing through the checkered brick-work the waste gases give up their excess of heat to the bricks and enter the bottom of the chimney shaft at about 300° C.

On reversing the air and gas currents, these acquire the temperature of the heated checkers before entering the hearth, which increment of heat is added to the hearth at every reversal of the valve. After some time the temperature of the checkers reaches about 1000° C., at which it is kept by regulating the supply of air so that now the excess of heat produced above that used up in the furnace is made up by radiation.*

* On working out the calorific equation for the O. H. furnace we arrive at the results below from the following data :

Natural gas used per ton of iron produced, 6000 cubic feet	
Temp. of chimney gas, 350° C above ord. temp. of air.	
Specific heat of these gases.....	.268 (average)
" " " air237
Latent heat of fusion of pig metal.....	33 cal.
" " " " steel.....	43 "
Average spec. heat of iron up to..... 1500° C=.	.180 (approx.)